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Mr. Austin H. Clark read the last paper of the meeting, describing 'A Case of Melanism in West Indian Honey Creepers.'

M. C. MARSH,
Recording Secretary.

DISCUSSION AND CORRESPONDENCE.

DR. O. F. COOK'S CONCEPTION OF EVOLUTION.

IN SCIENCE, March 30, 1906, p. 506, Dr. O. F. Cook expresses the opinion that in the recent discussion of isolation as an evolutionary factor there is 'a need of a simple distinction,' and asserts that isolation does not play a part in evolution. A similar idea, that neither isolation nor natural selection nor mutation factors in evolution, had been maintained by him previously in a series of publications, the last of which is a paper printed by the Washington Academy of Sciences.¹

This astonishing view should be carefully investigated and analyzed, for up to the present time every writer on evolutionary subjects, no matter what his standpoint, has taken it for granted that any of the factors introduced, if they are admitted at all, are admitted on the ground that they are factors cooperating in the general process called evolution. Dr. Cook, however, believes that isolation, natural selection, mutation, etc., have nothing to do with evolution, and that the last is a different process, due to 'causes resident in species.'

Looking more closely upon his views, it becomes evident that Dr. Cook's conception of 'evolution' is different from that of other writers, and, of course, the propriety of his criticism of the latter depends on the correctness of his new conception of evolution.

As every student of evolution knows, and as also Dr. Cook admits,² 'evolution,' as the word implies, was originally intended to characterize the whole process by which the organic world has been formed. According to the view of Linnaeus, the organic world, as it now exists, divided up in species, was created

¹O. F. Cook, 'The Vital Fabric of Descent,' *Proc. Wash. Acad. Sci.*, 7, March 19, 1906, p. 301 ff.

²O. F. Cook, 'Evolution not the Origin of Species,' *Pop. Sci. Mo.*, 64, 1904, p. 445.

so, and the number of existing species has remained permanent since their creation; according to Cuvier, a number of successive creations of species have taken place, each destroyed by a catastrophe. The 'theory of evolution' is opposed to the assumption of a permanency or stability, and introduces the view that the present organic world has developed out of preexisting forms, the former being evolved, or developed, or descended from the latter, and it admits the possibility of the splitting up of one species into two or more. Thus 'evolution' becomes a concept contrary to permanency or stability, and expresses the belief that organisms have reached their present state by degrees, by a change or transmutation, which they have undergone during the process of descent from their ancestors, connected with a differentiation. Since this theory has been proposed in order to explain the present condition of things, chiefly the separation of the organic world into a large number of species, the whole process of evolution has been called by Darwin 'origin of species,' and Darwin's theory is known as the 'theory of evolution,' or the 'theory of descent,' and the terms 'evolution,' 'descent,' 'development' have been used as synonyms.

But this is wrong, according to Dr. Cook. Already Darwin's phrase 'origin of species' (the 'species-origination box,' as Dr. Cook very elegantly calls it) does not include the factor of 'evolution,' for evolution is different from 'speciation,' or the making of species. Evolution is a 'process of organic change and development, universal and continuous'; it is a 'continuous progressive change'; it is the 'progressive development of organisms'; it is a 'process of change in species'; which means to say that it is characterized by a continuous *change* of the organisms, which becomes evident and visible by the fact that the descendants differ from their ancestors. This *change* observed in the organic world is paramount in Dr. Cook's conception of 'evolution'; he restricts this term thus, and uses it exclusively to express this fact. What happens later to the changed organisms through the action of natural selection, segregation, etc., is entirely

outside of 'evolution,' and is another process, called by Dr. Cook 'speciation.' Both processes are connected only in so far as evolution furnishes the material for speciation.

This analysis shows at a glance that what Dr. Cook calls 'evolution' is in fact nothing but the well-known process of 'variation';³ possibly it is only a special form of it, since according to Dr. Cook's statements, a progress or advance is implied in 'evolution.' Be this as it may, evolution in Dr. Cook's sense is certainly included in the old concept of variation, that is to say in the general and fundamental axiom of the Darwinian theory that organic beings, during the process of development, change or vary, that the descendants may differ from their ancestors, that a change of characters takes place during the phylogenetic development of organic forms.

Thus Dr. Cook's idea is *new* only in so far as he tries to restrict the original meaning of the term 'evolution.' In previous literature, 'evolution' includes *all* factors that contribute to the development of the organic world: it includes variation as well as inheritance, natural selection and segregation⁴ and several others, which have not found universal recognition as independent processes. But now Dr. Cook tries to teach us that the word 'evolution' should be deprived of its general meaning, and should be used only in place of 'variation,' with a peculiar restriction.

It hardly seems advisable to accept this change of the meaning of a word used in the same sense by *all* previous writers. Although Dr. Cook feels the necessity of doing so, and in spite of his criticism of the 'chosen people of science' for their failure to see the propriety of this change, I for my part prefer to call the whole process of development of the organic world, from its beginning to its end, by the name of 'evolution,' which is synonym to 'development,' and also to 'origin of species,' 'descent,' and also to 'Darwinian the-

ory.' Dr. Cook's 'simple distinction' between 'evolution' (= variation) and 'speciation' (= all other factors) is not simple at all, but highly confused and confusing, since the meaning of a well-established word is arbitrarily changed, without the slightest necessity (other terms being available). Thus I must positively decline to accept Dr. Cook's conception of 'evolution.'

To the disinclination of other men of science to accept the terminology suggested by Dr. Cook is apparently due his complaint that the 'very ungracious task to convince' them of the correctness of his position falls upon his shoulders. But there is no need for him to complain. *The distinction recommended has actually been made before*, and there have been other people who have conceived similar ideas, although different terms were used by them. I myself have emphasized in the article referred to by Dr. Cook,⁵ that I regard isolation only as a factor in *species-making* (speciation), and have quoted a paper of mine,⁶ where I have set forth my views in detail. Thus, five years before Dr. Cook's first publication on this subject,⁷ I have 'perceived these elementary facts,' that there are not only 'two groups of phenomena belonging to entirely different categories,' but that there are *four* of them. *The first of them is variation*, which furnishes the material for the others, and must be taken for granted, no matter 'what an Irishman might say.' But this has not 'saved the writing' of Dr. Cook's papers, for he apparently has not taken the trouble to ascertain what my views are. Moreover, I do not claim, by any means, to be the only one who was able to 'perceive this elementary fact' that the origin of species is composed of several processes belonging to different categories, but I have always affirmed that already Darwin, in the 'Origin of Species' very properly distinguished them and discussed them, at least saw clearly *that there are different questions involved*. That Darwin has been misunderstood and misin-

³ 'Evolution . . . is the journey of which individual variations are steps.' O. F. Cook, in *Pop. Sci. Mo.*, 64, 1904, p. 449.

⁴ For particulars see *Proc. Am. Philos. Soc.*, 35, 1896, p. 188.

⁵ *SCIENCE*, January 12, 1906, p. 71.

⁶ *Proc. Am. Philos. Soc.*, 35, 1896, p. 175 ff.

⁷ *SCIENCE*, 13, 1901, p. 969.

terpreted by those that have studied his writings, is to be regretted, but is excusable; that his views are judged upon without his works being read, as is sometimes the case, is inexcusable.

Aside from the above objection to Dr. Cook's use of the term 'evolution,' I wish to emphatically object to his idea of the 'actuating causes' of 'evolution' (or variation). He believes that they are not to be sought in the 'pressure of environment,'⁸ but that they are 'inner' causes, supported by interbreeding.

This view is not new at all, indeed we may say that, by this time, *it is venerable on account of its antiquity*, for it is the view held by the earlier Weismannian school, which assumes that variation is due to inner causes (germinal variation, spontaneous variation, Keimvariation), aided by amphimixis (interbreeding). I have demonstrated⁹ that this view, which, as it is proper to state, is not held any more by Weismann himself, is entirely illogical; but I do not see the necessity of repeating here my arguments for Dr. Cook's benefit. This much, however, may be said, that the assumption that only inner causes are 'actuating' in the production of variation, expressly excludes a class of causes which is absolutely necessary for every process in this world, namely the 'causæ efficientes.' That Dr. Cook has entirely forgotten what a 'causa efficiens' is is shown by the distinction he makes between *occasion* and the *true, actuating cause*.¹⁰ But he may be excused on the ground that the discovery of the difference of these terms, and of the fact that what he calls *occasion*, is no *true cause*, is not his: it is a perpetuation or repetition of a blunder committed first by Weismann,¹¹ and by von Graff,¹² in making a distinction between *Bedingung* and *Ursache*, or *condition* and *cause*.

⁸ C. H. Merriam, *SCIENCE*, February 16, 1906, p. 244.

⁹ 'Ueber Keimvariation' in *Biolog. Centralblatt*, 18, 1898, p. 139 ff.

¹⁰ *Proc. Wash. Acad. Sci.*, 1906, p. 305.

¹¹ 'Ueber Germinalselection,' 1896, p. 48, footnote 2.

¹² 'Zoology since Darwin' in *Ann. Rep. Smiths. Inst.*, 1896, p. 486.

Indeed, it is too bad that this discovery of Dr. Cook, that the *occasion* (or *condition*) is no *actuating cause*, can not stand in the face of philosophical criticism. For, if the *occasion* of Dr. Cook is the same thing that is called *causa efficiens* (*actuating cause*) by people trained in logic, then, of course, *external influences must be admitted as the causæ efficientes of variation*.

A. E. ORTMANN.

CARNEGIE MUSEUM, PITTSBURG, PA.

April 2, 1906.

THE DISTRIBUTION OF GOVERNMENT PUBLICATIONS.

To the Editor of Science: The letter on page 545 of *SCIENCE* for April 6, 1906, from Junius Henderson, of Boulder, Colo., relates to a subject that has always had a personal interest for me. I can never forget the advantages that I myself derived from the generosity of a father who enabled me to begin the accumulation of a scientific library. Equally advantageous have been the gratuitous publications of the government, and the comparatively cheap publications of scientific societies, as contrasted with the very high prices charged by many publishing firms for strictly technical scientific documents. It is to the best interests of our national government, our state governments and our endowed universities that they should, in every way possible, stimulate the publication and distribution of researches that, taken collectively, mark the steady progress of man in wresting her secrets from nature.

Perhaps to an equal degree is it the duty of the citizens, so far as is any way practicable, to stimulate the establishment of scientific and technical libraries in localities where they may be accessible to large numbers of students. The increase and diffusion of knowledge should not be left to the Smithsonian alone, or to the government, or to the university as an organization, but has become the duty of each individual scholar. Many men have considerable collections of valuable books that they should make accessible to students, rather than keep them locked up on their own shelves. I know of several who are